

CLAIMS

1. An anisotropic conductive connector device comprising:
 - an anisotropic conductive film provided with a plurality of conducting path forming portions extended in a direction of a thickness in a state in which they are insulated from each other through an insulating portion; and
 - a sheet-like connector in which an insulating sheet is provided with a plurality of electrode structures extended in a direction of a thickness thereof,
- 10 wherein the sheet-like connector is provided integrally on the anisotropic conductive film in a state in which each of the electrode structures is positioned on each of the conducting path forming portions of the anisotropic conductive film.
- 15 2. The anisotropic conductive connector device according to claim 1, wherein the sheet-like connector is provided with a through hole penetrating through both sides of the insulating sheet and the electrode structure is provided in the through hole.
- 20 3. The anisotropic conductive connector device according to claim 1 or 2, wherein the electrode structure of the sheet-like connector includes:
 - a surface electrode portion exposed from a surface of the

insulating sheet;

a back electrode portion exposed from a back face of the insulating sheet; and

5 a short circuit portion extended in a direction of a thickness of the insulating sheet,

wherein the surface electrode portion and the back electrode portion are coupled integrally through the coupling portion.

10 4. The anisotropic conductive connector device according to any of claims 1 to 3, wherein a through hole for coupling is formed on the insulating sheet of the sheet-like connector, the insulating portion of the anisotropic conductive film is provided with a protruded portion for coupling which is 15 protruded from a surface thereof, and

the protruded portion for coupling in the anisotropic conductive film is inserted in the through hole for coupling in the sheet-like connector.

20 5. An anisotropic conductive connector device comprising: an anisotropic conductive film provided with a plurality of conducting path forming portions extended in a direction of a thickness in a state in which they are insulated from each other through an insulating portion; and

a sheet-like connector in which an insulating sheet is provided with a plurality of electrode structures extended in a direction of a thickness thereof,

wherein the sheet-like connector is integrated on the
5 anisotropic conductive film in a state in which each of the electrode structures is positioned on each of the conducting path forming portions of the anisotropic conductive film.

6. The anisotropic conductive connector device according to
10 claim 5, wherein the sheet-like connector is provided with a void communicating with both sides of the insulating sheet and the electrode structure is provided in the void.

7. The anisotropic conductive connector device according to
15 claim 6, wherein the insulating sheet of the sheet-like connector is formed by a mesh, a nonwoven fabric or a porous sheet.

8. The anisotropic conductive connector device according to
any of claims 1 to 7, wherein the anisotropic conductive film
20 is formed by an insulating elastically polymeric substance, and the conducting path forming portion contains a conductive particle exhibiting a magnetism.

9. The anisotropic conductive connector device according to

any of claims 1 to 8, wherein a supporting body for supporting a peripheral edge portion of the anisotropic conductive film is provided.

5 10. The anisotropic conductive connector device according to any of claims 1 to 9, which is provided between a circuit device to be an inspecting object and a circuit board for an inspection and serves to carry out an electrical connection of an electrode to be inspected in the circuit device and an inspecting electrode
10 of the circuit board,

wherein the sheet-like connector is disposed on one surface side placed in contact with the circuit device to be the inspecting object.

15 11. The anisotropic conductive connector device according to claim 10, wherein the anisotropic conductive film is provided with the conducting path forming portions which are not electrically connected to the electrode to be inspected, in addition to the conducting path forming portions which is
20 electrically connected to the electrode to be inspected in the circuit device to be the inspecting object.

12. The anisotropic conductive connector device according to claim 10 or 11, wherein the conducting path forming portions

are disposed at a constant pitch.

13. A method of manufacturing the anisotropic conductive connector device according to any of claims 1 to 4 and 8 to 12,
5 comprising the steps of:

preparing a metal mold for molding an anisotropic conductive film in which a molding space is formed by a pair of molds;

10 forming a molding material layer constituted by a molding material for an anisotropic conductive film containing a conductive particle exhibiting a magnetism in a liquid polymeric substance forming material to be an elastically polymeric substance by curing in the metal mold and disposing the sheet-like connector on the molding material layer; and

15 then applying a magnetic field having an intensity distribution in a direction of a thickness of the molding material layer and carrying out a curing treatment over the molding material layer,

20 the anisotropic conductive connector device having the sheet-like connector provided integrally on the anisotropic conductive film being thus obtained.

14. The method of manufacturing the anisotropic conductive connector device according to claim 13, wherein, by using, as

the insulating sheet, a sheet-like connector provided with a through hole penetrating through both sides of the insulating sheet,

5 a molding material layer is formed in order to fill the through hole of the insulating sheet with a molding material for an anisotropic conductive film.

15. The method of manufacturing the anisotropic conductive connector device according to claim 13 or 14, wherein, by using, 10 as the insulating sheet, the sheet-like connector having a through hole for coupling formed on the insulating sheet,

a molding material layer is formed in order to fill the through hole for coupling in the sheet-like connector with a molding material for an anisotropic conductive film.

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16. The method of manufacturing the anisotropic conductive connector device according to any of claims 13 to 15, further comprising the sheet-like connector forming steps of:

20 forming a through hole penetrating through both sides of the insulating sheet on the insulating sheet in accordance with a pattern corresponding to a pattern of an electrode structure to be formed by a laser processing method or a dry etching method, and

filling the pattern hole with an electrode structure

material by a plating method, thereby forming the sheet-like connector in which the insulating sheet is provided with a plurality of electrode structures extended in a direction of a thickness thereof.

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17. A method of manufacturing the anisotropic conductive connector device according to any of claims 5 to 12, comprising the steps of:

preparing a metal mold for molding an anisotropic conductive film in which a molding space is formed by a pair of molds;

forming a molding material layer constituted by a molding material for an anisotropic conductive film, in which a conductive particle exhibiting a magnetism in a liquid polymeric substance forming material to be an elastically polymeric substance by curing, in the metal mold, and disposing the sheet-like connector on the molding material layer; and

then applying a magnetic field having an intensity distribution in a direction of a thickness of the molding material layer and carrying out a curing treatment over the molding material layer,

the anisotropic conductive connector device having the sheet-like connector integrated on the anisotropic conductive film being thus obtained.

18. The method of manufacturing the anisotropic conductive connector device according to claim 17, wherein, by using, as the insulating sheet, a sheet provided with a void communicating
5 with both sides of the insulating sheet,

a molding material layer is formed in order to fill the void of the insulating sheet with a molding material for an anisotropic conductive film.

10 19. The method of manufacturing the anisotropic conductive connector device according to claim 18, wherein the insulating sheet of the sheet-like connector is formed by a mesh, a nonwoven fabric or a porous sheet.

15 20. The method of manufacturing the anisotropic conductive connector device according to any of claims 17 to 19, further comprising the sheet-like connector forming steps of:

applying a resist to both sides of the insulating sheet to form a resist layer;

20 peeling the resist layer in accordance with a pattern corresponding to a pattern of an electrode structure to be formed, thereby forming a plurality of pattern holes on the resist layer; and

filling the pattern hole with an electrode structure

material and then peeling the resist layer, thereby forming the sheet-like connector in which the insulating sheet is provided with a plurality of electrode structures extended in a direction of a thickness thereof.

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21. The method of manufacturing the anisotropic conductive connector device according to any of claims 17 to 20, wherein a protective film is disposed between a molding surface of one of molds in the metal mold and the sheet-like connector.

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22. The method of manufacturing the anisotropic conductive connector device according to any of claims 13 to 21, wherein a supporting body protruded from a molding space is disposed between the pair of metal molds and the molding material layer 15 is subjected to a curing treatment so that an anisotropic conductive connector device provided with a supporting body for supporting a peripheral edge portion of the anisotropic conductive film is obtained.

20 23. The method of manufacturing the anisotropic conductive connector device according to claim 22,

wherein a spacer is provided between the pair of metal molds and the supporting body to form the molding space and the molding material layer is subjected to curing treatment

so that an anisotropic conductive connector device, which is provided with the supporting body for supporting a peripheral edge portion of the anisotropic conductive film, is obtained.

5 24. An apparatus for inspecting a circuit device comprising:
a circuit board for an inspection which has an electrode
for an inspection disposed corresponding to an electrode to be
inspected in a circuit device to be an inspecting object; and
the anisotropic conductive connector device according to
10 any of claims 1 to 12 which is disposed on the circuit board
for an inspection.